RUST GEOTECH INC.

Spectral Gamma-Ray Borehole
Log Data Report

Borehole 51-04-08

Log Event A

Borehole Information

Farm : TX	**Tank :** TX-104	**Site Number :** 299-W15-131
N-Coord : 41,626	**W-Coord :** 76,093	**TOC Elevation :** 668.57
Water Level, ft :	**Date Drilled :** 11/12/1971	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 100	

Borehole Notes:
This borehole was drilled in November 1971 and completed to a depth of 100 ft. The casing in the borehole is assumed to be 6-in., schedule-40 steel tubing with a wall thickness of 0.280 in. The drilling log does not mention grout or casing perforations. The top of the borehole casing is even with the ground surface. The SGLS was able to reach a depth of 99.5 ft.

Equipment Information

Logging System : 1	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 04/1996	**Calibration Reference :** GJPO-HAN-5	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number : 1	**Log Run Date :** 4/12/1996	**Logging Engineer:** Alan Pearson
Start Depth, ft.: 0.0	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 10.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Log Run Number : 2	**Log Run Date :** 4/15/1996	**Logging Engineer:** Bob Spatz
Start Depth, ft.: 99.5	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 9.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

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Analysis Information

Analyst : E.P. Baumgartner

Data Processing Reference : P-GJPO-1787 Analysis Date : 8/15/1996

Analysis Notes :

The logging of this borehole was completed in two runs using the SGLS. The field verification spectra recorded immediately before and after the survey operation met the acceptance criteria established for the peak shape and system efficiency, confirming the SGLS system was operating within specifications. The energy calibration and peak-shape calibration from these verification spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing-correction factors for a 0.280-in.-thick steel casing were applied during analysis.

A depth overlap, where data were collected by separate logging runs at the same depth, occurred in this borehole between depths of 9 and 10 ft. The concentrations of the man-made (Cs-137) and the natural radionuclides K-40 and Th-232 were calculated at the overlapping depths using the separate data sets and were within the statistical uncertainty of the measurements, indicating very good repeatability of the measurements. The difference in the calculated U-238 concentration at the overlapping points exceeded the statistical uncertainty of the measurements; however, the U-238 determination is affected by radon gas entering and exiting the borehole between logging runs. The radon in the borehole environment cannot be stablized over multiple logging runs.

Cs-137 was the only man-made radionuclide detected in this borehole. Cs-137 was detected semicontinuously from the surface to 23 ft with two distinct peaks at 11.5 and 17 ft. The peak at 11.5 ft has a maximum concentration value of about 4.5 pCi/g, and the peak at 17 ft has a maximum value of about 3 pCi/g. Cs-137 was not detected below 23 ft in this borehole.

The K-40 concentration log has a sharp increase at 48 ft from a mean of about 12 pCi/g to a mean of 20 pCi/g.

Details regarding the interpretation of the data for this borehole are presented in the Tank Summary Data Report for tank TX-104.

Log Plot Notes:

Separate log plots show the man-made (e.g., Cs-137) and the naturally occurring radionuclides (e.g., K-40, U-238, and Th-232). The natural radionuclides can be used for lithologic interpretations. The headings of these plots identify the energy peak for the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainty for the calculated concentrations at the 95-percent confidence level. The MDL is shown by open circles on the plots. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made radionuclides, the naturally occurring radionuclides, the total gamma count derived from the SGLS and a Tank Farm gross gamma log. The gross gamma plot displays the latest available digital data from the database with no attempt to adjust the depths to coincide with the SGLS data.